

9686

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**CITY OF GARDNER**  
**MASSACHUSETTS 01440-2630**

OFFICE OF THE  
CITY COUNCIL



October 6, 2016

**NOTICE OF PUBLIC HEARING**  
**NEW/EXPANDED SLUDGE LANDFILL**

Notice is hereby given that the City Council will conduct a Public Hearing on Monday, October 17, 2016 at 6:00 P.M. in the City Council Chamber, Room 219, City Hall, 95 Pleasant Street, Gardner, Massachusetts, to hear testimony concerning the DPW Plan to Upgrade the Dewatering Equipment and Pursuit of a New/Expanded Sludge Landfill (City Council Calendar #9686). Persons interested in this matter are encouraged to attend and to offer testimony.

The Gardner News, Monday, October 10, 2016 - 13

**LEGAL NOTICES**

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**CITY COUNCIL OF GARDNER**  
ALAN L. AGNELLI, City Clerk

oct10-1t

**CITY COUNCIL OF GARDNER**

*James M. Walsh*

**JAMES M. WALSH**  
Council President

RESOLUTION  
ENDORISING THE DEPARTMENT OF PUBLIC WORKS PLAN  
TO UPGRADE THE DEWATERING EQUIPMENT  
AND PURSUIT OF A NEW/EXPANDED SLUDGE LANDFILL

The City Council of Gardner wishes to endorse the Department of Public Works Plan to upgrade the dewatering equipment and pursue a new/expanded sludge landfill.

The plan will include improving the technology, replacing the pumps, repairing the 30 year old facility, and pursuing a new/expanded sludge landfill. The City has performed a comprehensive study looking at several alternatives for the disposal of the City's sludge. These options included composting, anaerobic digestion, off-site disposal by a private hauler, and upgrading and continuing our current operations.

Based on the evaluations, the most cost effective long term solution was deemed to be upgrading the present dewatering equipment and disposing of the sludge at a City owned sludge landfill.

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**CITY OF GARDNER**

**Department of Public Works**

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CITY CLERKS OFFICE  
GARDNER, MA



- Highway
- Water
- Sewer
- Forestry
- Parks/Playgrounds
- Cemeteries

Dane E. Arnold, Director  
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 Gardner, MA 01440-2687  
 Telephone (978) 632-7661  
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 darnold@gardner-ma.gov

Mayor and City Council  
 City Hall  
 95 Pleasant Street  
 Gardner, MA 01440

RE: Dewatering and Sludge Landfill

June 1, 2016

Dear Mayor and City Council:

I am writing you in regards to the on-going upgrade at the Wastewater Treatment Facility (WWTF). The upgrade not only includes improving the technology, replacing pumps, and repairing the 30 year old facility, but also includes determining the most cost effective method to dispose of our sludge for the next 25-30 years.

Over the past year we have completed a comprehensive study and looked into several alternatives for the disposal of the City's sludge. This evaluation was very in-depth and took into consideration future costs, fuel prices, electrical costs, trucking costs, odors, design costs, construction costs, and even contract negotiations with disposal sites, other municipalities, and trucking companies.

Options we considered for disposing of the City's Sludge:

1. Continue to dewater sludge at plant and haul to City Owned Sludge Landfill.
2. Composting Sludge at our Sludge Landfill
3. Anaerobic Digestion
  - a. Another Municipality
  - b. At our WWTF
4. Offsite Disposal by a Private Hauler
  - a. Haul liquid sludge to off-site Landfill
  - b. Haul sludge cake to off-site Landfill
  - c. Haul liquid sludge to an off-site Incinerator

Attached are detailed descriptions and cost analysis of each method.

**DEWATERING**

This study also included looking at many technologies to reduce the amount of moisture contained in the sludge. Again, many items were evaluated, such as design costs, construction costs, electrical costs, repair and replacement costs, and ease of operation.

After evaluating different technologies and visiting other facilities, it was determined that a centrifuge would be the best alternative for the dewatering the City's wastewater sludge. A pilot test of a centrifuge was conducted in August of 2015; which is basically a large cylinder that spins and uses centripetal force to dry the sludge and great results were achieved.

The importance for the correct dewatering technology is very important for several reasons. The dryer the sludge that can be achieved, the less amendment (sand) has to be added to aid in "working" the material at the landfill. Also, the dryer the sludge, the less odors are generated during the hauling and covering process at the landfill. For every cubic yard of sand we save, its money not spent. Over 25 years, this could add up to be millions of dollars. Also, for every cubic yard of amendment we don't use, is a cubic yard we can extend the capacity of the sludge landfill in the future. In other words if we can generate a sludge that uses 30% less additive, we will extend the life of our landfill by 30%.

We have determined that replacing the old Belt Filter Presses that exist at the WWTF with Centrifuges for the dewatering process and hauling the dewatered sludge cake to the City's Sludge Landfill is the most cost effective and best alternative for the disposal of the City's sludge.

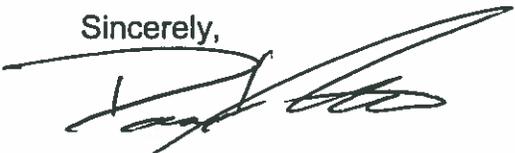
### **LANDFILL**

The decision to move forward with the design and construction of Centrifuges would ultimately mean the expansion of the Sludge Landfill located off West Street. The cost of expanding the Sludge Landfill was factored into the cost analysis of our recommended alternative. Even with the nearly million dollar construction costs of the sludge landfill factored into the annual costs, we still found it almost half the cost compared to hauling the sludge out of town. Supporting documentation is enclosed.

Currently the Sludge Landfill has capacity and Suez (formally Earth Tech) is on the hook for sludge disposal until 2018 when their contract expires. The City needs to prepare and submit design plans for a Horizontal Expansion (outward). It is very important to note that DEP has acknowledged the site is already permitted for such expansion. Once we have all design documents approved by DEP, we would be looking to have the expansion of the Landfill completed when Suez's contract expires in 2018.

If you have any questions or would like to discuss this matter as a whole, I would be glad to have a meeting.

Sincerely,



Dane E. Arnold, Director  
Department of Public Works

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PC: Bob Hankinson, City Engineering Department  
Matt LaPointe, Suez  
Jen Susan-Roy, Board of Health  
Rob Sims, Maguire  
Kevin Olsen, Wright Pierce



February 2, 2016

Mr. Dane E. Arnold  
Director  
Gardner DPW  
416 West Broadway  
Gardner, MA 01440

**Re: Gardner Wastewater Treatment Plant Upgrades  
Sludge Disposal Evaluation**

Dear Dane:

This letter provides a brief overview and summary of recent studies and evaluations that have been conducted to assess long term methods for disposing of the sludge from the City's Wastewater Treatment Plant (WWTP) on Plant Road in Templeton.

#### **EVALUATION BACKGROUND**

The City has conducted a Wastewater Facility Plan for upgrades to the WWTP. One facet of the facility plan evaluations was an assessment of the sludge processing and disposal alternatives for the WWTP.

The Facility Plan evaluated several technologies for dewatering sludge including Inclined Screw Press, Horizontal Screw Press, Rotary Press, Centrifuge and the current technology Belt Filter Press. Major factors considered in the alternative evaluation included capital cost, energy consumption, disposal costs, transportation, additives (sand), sampling and general operation and maintenance.

**Dewater and City Owned Landfill** – This alternative included upgrades to the dewatering process at the WWTP and disposal at the City owned landfill on West Street. Capital costs including dewatering equipment upgrades and expansion costs for the landfill are included.

**Dewater and Haul** – This alternative included modifications to the dewatering methods at the WWTP with private hauling of dewatered sludge for disposal. Although the use of the landfill is eliminated there are increased transportation and volatile disposal costs. Unknown variables exist for the alternative as the private hauler with likely have contract provisions for changes in regulations, fuel costs and the availability of their disposal site.

**Haul Liquid** – This alternative involved no modifications at the WWTP, but did include disposal costs. This alternative is the most volatile due to unknown contractual impacts for changes in regulation, fuel and available space at private disposal locations. Although not a responsibility of the City, because the volume of the sludge has not been reduced through dewatering, there will be an increase in truck traffic at the WWTP.

Based on the information gathered, the present worth cost for the 20-year planning period of the three alternatives is presented in the following table. To obtain the present worth value the annual operating & maintenance costs are amortized and added to the capital costs. For this evaluation we used a 20-year term and the City's current borrowing rate of 3.75%.

Alternative	Dewater & City Owned Landfill Disposal	Dewater & Private Hauler	Haul Liquid
Capital Costs	\$4,183,200 <sup>(1)</sup>	\$3,416,500 <sup>(2)</sup>	\$0 <sup>(3)</sup>
Annual Operation & Maintenance Costs	\$221,200	\$536,550 <sup>(4)</sup>	\$897,300 <sup>(4)</sup>
Present Worth	\$7,435,000	\$12,789,000	\$12,470,000

- (1) Includes \$3.4 million for dewatering upgrades and \$0.77 million for expansion costs at the current sludge landfill.
- (2) Includes \$3.4 million for dewatering upgrades
- (3) Does not include an amount for new sludge pumping equipment
- (4) Includes costs for additional sludge sampling

Based on the evaluations, it was determined that the most cost-effective long-term solution for the City's wastewater sludge processing is to upgrade the present dewatering equipment and continue to dispose of dewatered sludge at the City's sludge landfill by expanding the capacity of the landfill.

We are prepared to meet with you to discuss our recommendation. We look forward to continuing the progress on the upgrades.

Very truly yours,

CDR MAGUIRE INC.



Robert P. Sims, PE  
Project Manager

cc: Steve Landry (CDR Maguire)  
Bob Hankinson (Gardner)  
Matt LaPointe (United Water)  
Kevin Olson (Wright-Pierce)

References:

1. Wastewater Treatment Facility Plan for the City of Gardner by Wright-Pierce, November 2015
2. CDR Maguire Landfill Expansion Capacity memorandum, February 2016

## *Memorandum*

**Date:** May 20, 2015  
**To:** Dane Arnold  
**From:** Robert Sims  
**Subject:** Gardner Sludge Disposal - Alternatives Analysis

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### **BACKGROUND**

The City of Gardner currently treats wastewater at a treatment facility located off of Parker Street in the Town of Templeton. The facility discharges into the Otter River. The facility is governed by the USEPA through a NPDES permit (Permit # MA0100994). This permit allows for a design flow of 5.0 million gallons per day of treated effluent to enter the Otter River. The discharge must meet limits of concentration and total loading mandated in the Permit.

As part of this process, sludge is removed during the primary and secondary phases of the treatment process. Once the sludge is removed it is stored in tanks and thickened by gravity. The thickened sludge (approximately 3% solids) is mixed with a polymer which hastens the removal of additional water and the mixture passes through a pair of belt filter presses. This process squeezes the water between two parallel permeable sheets and water is extruded. The extruded water is drained off and returned to the headwater of the plant. The solids content of the sludge is increased to about 22% and it is now referred to as sludge cake.

The cake falls off of the press and is deposited into a dump truck and hauled to the sludge landfill where it is mixed with approximately 3:1 ratio of amendment (sand, dirt and gravel) to further increase the solids content and make the material workable for spreading at the landfill. Once spread, it is covered with a daily cover to reduce odors.

The pressing and hauling currently occurs 4 days a week and 8 trucks of sludge are deposited and worked at the landfill. The average monthly total (as reported in annual reports) is approximately 400 cubic yards per month.

This evaluation is to perform a comparison of three additional alternatives for processing of the sludge. The driving factor in the analysis will be cost, but other factors such as land use and needed infrastructure improvements will be part of the discussion. Although much harder to define, but equally important are the impact of environmental changes and reliance on stable and predictable costs from private waste haulers.

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## ALTERNATIVES

As part of the alternatives analysis we investigated the cost and non-cost impacts for utilizing each alternative. The costs included the cost of land, infrastructure improvements, equipment purchase and operation and maintenance. The non-cost impacts included traffic and odors.

- Continue dewatering and landfilling
- Composting
- Anaerobic Digestion
- Offsite disposal

For the new options we considered the pros and cons of performing the activity at the treatment plant and at the landfill site.

## OPTIONS

Option 1 - Continue dewatering and landfilling. This option is a continuation of the current method of sludge disposal and would require little change. Sludge is thickened and dewatered at the plant and transported to the sludge landfill. Due to size restraints of the existing landfill, the current landfill would have to be expanded. The City currently owns the property for the expansion. In addition, the site has been assessed and approved by the regulatory agencies. This was completed prior to the original construction in the late 1980's.

The costs for this option will include development of the plans for the expansion, replacement of the existing dewatering equipment, site work, installation of a liner, an extension of the existing leachate collection system and mixing material. It is anticipated that a portion (if not all) of the in-situ material can be used for daily cover and final cover material for the closing of the existing landfill.

As stated above, the land has already been set aside for development as a sludge landfill. This was completed as part of the original approval.

Option 2 – Composting. This option would involve gravity thickening and dewatering of the sludge prior to conversion to compost. To convert to compost, the dewatered sludge will be mixed with an amendment (typically wood chips) and stored for decomposition. To facilitate a consistent process and finished product, the mixed piles of sludge and amendment are placed over a pumped air distribution system. The mixture can also be simply turned with mechanical equipment, but utilizing the supplemental air controls the process and ensures complete conversion of the material.

For composting it is best to have the process be performed under cover. This does not have to be an enclosed setting, but protection from rain is key. Simple structures are available to perform this process, but the process needs a place for construction. Besides needing space for the cover, air blowers, piping and wood chips would have to be purchased and stored. It's anticipated that approximately 3 acres of space would be needed for this process. It's expected that this would either occur at the existing treatment plant or at the sludge landfill.

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Each site has its limitation and would require some site work. The existing sand filter beds at the treatment plant were constructed to allow treated water to soak into the ground. This condition is not preferred for composting and would have to be modified with some sort of impenetrable covering, most likely concrete. The landfill site is suitable yet is currently wooded. Some clearing and site development would have to occur. Each option would require that a site specific design be performed.

A key component of the composting option is being able to dispose of the finished product. Testing of the sludge is being performed to determine the quality. Massachusetts environmental regulations (310 CMR 32.00) dictate the limits of the end use of compost based on the concentration of certain components of the sludge.

1. Type I Sludge – Distributed without further DEP approval
2. Type II Sludge – Distributed only with prior DEP approval
3. Type III Sludge – Not for food chain crops and applications are recorded for the property at the Registry of Deeds

The Type of material created greatly dictates the ability to dispose of the finished product. Whereas a Type I sludge can be sold or given to homeowners for lawn and garden supplement without any further input from the regulatory agencies, a Type III compost would have a very limited distribution and it is feasible that a cost would be incurred for final disposal. The Town of Pepperell has a small composting facility that has is a Type I product and the Town is able to dispose of their product through uses by the DPW, homeowners and landscapers. Their sludge meets the DEP requirements.

Additionally, since composting occurs in an open air environment, the generation of odors and other vectors (birds and rats) are a distinct possibility.

Option 3 – Anaerobic Digestion. This process involves utilizing the gravity thickened (but not dewatered) sludge and introducing it into an anaerobic (no oxygen) environment that allows certain bacteria to grow that destroy the pathogens in the sludge. Food waste can also be added to enhance the process. Changes in food waste disposal regulations support the development of these kinds of operations. Depending on the characteristics of the sludge certain amounts of methane are produced that can be used for energy production (and cost recovery). One of the inherent downsides to this operation is that sludge is still produced requiring disposal. Disposal through the open market is possible, but quality limitations determine the approved end use.

The City of Fitchburg has recently begun an investigation to create an energy generation project by utilizing sludge from their in-City treatment plant, in-City paper mill waste, in-City food waste and wastewater sludge from surrounding communities. At a public hearing on March 31, 2015, the consulting engineer for the City held a public forum to present the idea and facilitate a discussion.

The Proposed Fitchburg proposal would generate 1.5 mega-watts of energy and require in addition to the six in-City truckloads of material, the delivery of 24 40-cubic yard dump trucks of wastewater sludge from surrounding communities. When asked why the proposal was for such a large complex and included the necessity for material from outside the community, the engineer stated that it needed to be that big to make the project viable by achieving the appropriate economy of scale. That being, that a smaller project would not be cost effective.

Fitchburg is in a unique situation because many of the facilities necessary for the process are already built. Their West Treatment plant was recently decommissioned yet some of the existing structures could house some of the needed equipment. This significantly reduces the capital costs. The intent of the Fitchburg facility is to fund the construction and operation through tipping fees and energy credits. If Gardner was to proceed with participating in the Fitchburg process, the existing process of dewatering the thickened sludge could be discontinued. However, a new tanker vehicle would be needed to transport the liquid sludge to Fitchburg. Additional capital would be required for new vehicle and new personnel expenses would be encumbered for the transportation to Fitchburg. Based on current sludge production, it is anticipated that approximately 10 tanker trucks a week would be delivered to Fitchburg.

For new anaerobic digestion facilities in Gardner, new structures would be required including tanks for processing, mixing and storage. Siting the anaerobic digestion process is complicated. It would be most cost-effective to locate it at the treatment plant to reduce the hauling of the liquid to an off-site location (most likely the sludge landfill).

The anticipated mixing ratio of food waste to sludge is estimated to be 1:5. That is you need 1/5 of the amount of food waste for the process. The exact ratio would need to be verified before a detailed analysis could be completed. Based on a study by the Commonwealth, the City of Gardner has 17 viable sources of food waste. These are shown in Table X. As seen in Table X, the 17 establishments in the City generate an estimate 3.31 tons of food waste per day. Based on the estimated ratio and the average production of 13.3 tons per day of sludge, the new anaerobic digestion facility would require 2.9 tons of food waste per day. That amounts to 88% of the food waste generated in the City. This data was taken from the Massachusetts Department of Environmental Protection Website – Food Waste Generation.

Because of the multiple sources of food waste, the collection by the City will require additional staff. Another option is to require the delivery of the food waste. Either way, the City will need a person to either collect the material or oversee the disposal by the generator.

TABLE 1  
SUMMARY OF FOOD WASTE GENERATORS IN GARDNER

Source	Location	Amount (Tons/year)
Burger King	Crawford Street	39.0
Legend Rehabilitation	Eastwood	39.4
Dunkin Donuts	Main Street	30.0
D'Angelo's	Union Square	24.0
Friendly's	Pearson Blvd	90.0
Heywood Hospital	Green Street	83.6
Heywood Transitional Care	Green Street	6.2
McDonald's	Timpany Blvd	45.0
Mt. Wachusett Community College	Green Street	92.5
Papa Gino's	Timpany Blvd	21.0
Peter Ray's Pan	Ross Road	105.0
Stop-n-Shop	Timpany Blvd	165.0
Stop-n-Shop	Timpany Blvd	300.0
Taco Bell	Pearson Blvd	27.0
Wachusett Manor	Hospital Hill	31.5
Wendy's	Pearson Blvd	40.5
Williams Restaurant	Pearson Blvd	67.5
	TOTAL	1207.2 or 3.31 tons/day

There appears to be available space at the treatment plant for construction. The downside is that the plant is located in the Town of Templeton and the power grid is owned and operated by the Templeton Power Utility that does not have incentive programs for these kinds of arrangements. Not receiving an incentive would reduce the viability of this option.

Siting the anaerobic digestion at the landfill site is possible but would involve developing a portion of the available space, the construction of the infrastructure, and hauling of the liquid to the site. It would however allow for the return of the investment in energy recovery. It's expected that the anaerobic digestion process would return power to the grid as the sanitary landfill currently does.

A major impact to the anaerobic digestion process is the ability to receive consistent quality of material (food waste and sludge). A consistent material will assist in generating a consistent product (energy and waste sludge). To allow for the delivery of consistent amounts of material, it is anticipated that storage facilities will be required for both sludge and food waste.

As with the production of compost, the quality of the sludge will affect the ability to dispose of the treated sludge from the anaerobic digestion process. Testing of the sludge is being performed to determine the quality. Massachusetts environmental regulations (310 CMR 32.00) dictate the limits of the end use of compost based on the concentration of certain components of the sludge.

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The Type of material created greatly dictates the ability to dispose of the finished product. Whereas a Type I sludge can be sold or given to homeowners for lawn and garden supplement, a Type III compost would have a very limited distribution and it's feasible that a cost would be incurred for final disposal.

To date the sludge generated in Gardner has not been sufficiently tested and an expectation of the quality of the end product of the anaerobic digestion process is uncertain.

At this time, based on the contributing issues in Gardner and the downsides from the presentation by Fitchburg, we would not recommend the creation of an anaerobic digestion facility for sludge disposal. However, in light of the recommendation, we have included a cost estimate for this option.

In addition to our evaluation of anaerobic digestion, we have had conversation with solid waste regulator's at the MADEP in Worcester and their opinion is that the logistic of a consistent product, food waste and byproduct render, this not a viable option.

Option 4 – Offsite Disposal. This option involves no action by the City other than contracting with a sludge hauler. There are subcategories for this type of disposal including:

- Hauling of liquid sludge by a hauler to a offsite landfill
- Hauling of sludge cake by a hauler to offsite landfill
- Hauling and incineration of liquid sludge to an offsite incinerator

Each subcategory has inherent costs. Aside from the cost of hauling and disposal, the sludge cake option would require the replacement of the belt filter press while the hauling of liquid sludge would require a retrofit at the treatment plant to accommodate the disposal of liquid sludge which is not currently an option.

These options are all viable, and in some cases moderately cost competitive, there is the unknown impact of changes regulatory environment and unknown contract language impacts from a private hauler. Specific modifications to the planned cost are very difficult to include in the analysis, but pose a significant risk.

### COST

For the cost evaluation we converted the capital and operating costs to an annualized cost. The City of Gardner Sludge Alternative Cost Summary is included at the end of this memorandum as well as a simplified summary for each option. For this evaluation we made the assumptions listed below.

- The term of the borrowing for the evaluation would be 20 years.
  - The interest rate would be 4% (based on current borrowing).
  - We assumed that the plant will not expand and will produce sludge at a consistent rate for the life of the term.
  - We assumed that the gravity thickener produces sludge at a consistency of 3% solids.
  - The belt filter press generates sludge at a rate of 22% solids.
-

- The current landfill accepts approximately 400 cubic yards of material every month (@22% solids). This calculates to approximately 1,500 dry tons per year.
- We assumed that the engineering, permitting and construction oversight for each alternative is 25%.
- To be slightly conservative in our approach and to allow for certain variability, we have also included a 25% contingency.
- For an option involving sludge cake, we assumed that the belt filter press would be replaced
- Operation & Maintenance of equipment is equal to 4% of the capital cost.
- Costs for Hauling liquid sludge, sludge cake and incineration were prorated to increase over the term of the evaluation at 4%.
- Power from anaerobic digestion valued at \$0.15 per Kilo-watt

### TRAFFIC

Another intangible that was not included as part of the cost evaluation is traffic. Currently the landfill option generates about 8 trips per week.

Composting would also include 8 trips per week of sludge cake to the landfill. The increase in traffic for hauling amendment would offset the hauling of amendment for the landfill option. Composting will not increase traffic.

The anaerobic digestion process involves the hauling of a liquid sludge. Since the dewatering reduces the overall volume, the number of truck trip would increase to approximately 10 trips per week of a 9,000 gallon truck.

A private hauler of sludge cake would likely reduce traffic as they would likely use a larger truck to maintain efficiency. A truck twice the size of the one currently used by the city would reduce the truck trips by 50% to approximately 4 a week. However, for hauling liquid sludge (disposal or incineration) would result in the same increase as hauling liquid to Fitchburg (8 to 10).

### ODORS

Odors are a part of sludge handling. Of the options investigated, the landfilling and compost have the highest incident of odor complaints. For anaerobic digestion and private hauling, it is expected that the odors would be limited to the treatment plant. Anaerobic digestion at the landfill site might have some odors, but they would be expected to be less than landfilling or composting.

As part of the vertical expansion of the existing landfill, the operator (United Water) is investigating the odors and is developing a plan for reducing the odors associated with the landfill operations.

### OTHER COSTS

A private hauler will also require that the material meet certain contaminant levels and require additional testing. From our discussion with a private waste hauler, some parameters are annually and

some are quarterly. The hauler's estimate of additional sampling would be an annual amount of \$15,000 to \$20,000.

**SUMMARY**

Given the cost comparison and the intrinsic risk of utilizing a private waste hauler, we recommend continuing with the process of dewatering and landfilling of the current sludge generated at the wastewater plant. Given the reasonably close cost analysis it may be beneficial to consider the hauling of sludge cake as a backup alternative.

Both options do require the replacement of the sludge dewatering equipment at the treatment plant and we feel confident that the City can continue with those plans.

**CITY OF GARDNER  
SLUDGE DISPOSAL ANALYSIS  
COSTING OF ALTERNATIVES**

OPTION	DESCRIPTION	ANNUAL COST	Delta	% inc.	VOLUME (dt/yr)	COST (\$/dt)
1	Landfill	\$ 360,960	\$ -	0%	1,500	\$ 240.64
2	Compost	\$ 626,400	\$ 265,440	74%	1,500	\$ 417.60
3A	Anaerobic Digestion - Fitchburg	\$ 623,780	\$ 262,820	73%	1,500	\$ 415.85
3B	Anaerobic Digestion - Gardner	\$ 676,160	\$ 315,200	50%	1,500	\$ 450.77
4A	Haul Liquid	\$ 937,700	\$ 576,740	160%	1,500	\$ 625.13
4B	Haul Sludge	\$ 435,600	\$ 74,640	21%	1,500	\$ 290.40
5	Haul & Burn	\$ 1,237,700	\$ 876,740	243%	1,500	\$ 825.13

CITY OF GARDNER SLUDGE ALTERNATIVES

OPTION 1 - LANDFILL		A/P, 20,4%				
		Item	term	interest	Cost Factor	Annual Cost
Capital	BFP	\$ 1,500,000	20	0.04	0.0736	\$ 110,400
	Land @ 150k/acre	\$ 900,000	20	0.04	0.0736	\$ 66,240
Subtotal		\$ 2,400,000	20	0.04	0.0736	\$ 176,640
Engineering (25%)		\$ 600,000	20	0.04	0.0736	\$ 44,160
Contingency (25%)		\$ 600,000	20	0.04	0.0736	\$ 44,160
		\$ 3,600,000	20	0.04	0.0736	\$ 264,960
O&M	O&M (4% of capital)	\$ 96,000				\$ 96,000
						Annualized cost \$ 360,960

OPTION 2-COMPOST		A/P, 20,4%				
		Item	term	interest	Cost Factor	Annual Cost
Capital	BFP	\$ 1,500,000	20	0.04	0.0736	\$ 110,400
	Composting Equip	\$ 500,000	20	0.04	0.0736	\$ 36,800
	Land Development	\$ 1,500,000	20	0.04	0.0736	\$ 110,400
Subtotal		\$ 3,500,000	20	0.04	0.0736	\$ 257,600
Engineering (25%)		\$ 875,000	20	0.04	0.0736	\$ 64,400
Contingency (25%)		\$ 875,000	20	0.04	0.0736	\$ 64,400
		\$ 5,250,000	20	0.04	0.0736	\$ 386,400
O&M	O&M (4% of capital)	\$ 140,000				\$ 140,000
	Manpower	\$ 100,000				\$ 100,000
						Annualized cost \$ 626,400

OPTION 3A ANAEROBIC DIGESTION - FITCHBURG		A/P, 20,4%				
		Item	term	interest	Cost Factor	Annual Cost
Capital	Tanker	\$ 200,000	20	0.04	0.0736	\$ 14,720
	Minor Improvements	\$ 500,000	20	0.04	0.0736	\$ 36,800
Subtotal		\$ 700,000	20	0.04	0.0736	\$ 51,520
Engineering (25%)		\$ 175,000	20	0.04	0.0736	\$ 12,880
Contingency (25%)		\$ 175,000	20	0.04	0.0736	\$ 12,880
		\$ 1,050,000	20	0.04	0.0736	\$ 77,280
O&M	O&M (4% of capital)	\$ 28,000				\$ 28,000
	Personnel	\$ 100,000				\$ 100,000
	Tipping Fee	\$ 279	1500			\$ 418,500
						Annualized cost \$ 623,780

CITY OF GARDNER SLUDGE ALTERNATIVES

OPTION 3B ANAEROBIC DIGESTION - GARDNER						A/P, 20,4%	
						Cost	Annual
		Item	term	interest	Factor	Cost	Cost
Capital	Tanker	\$ 200,000	20	0.04	0.0736	\$	14,720
	Site Improvement	\$ 1,875,000	20	0.04	0.0736	\$	138,000
	Land Development	\$ 450,000	20	0.04	0.0736	\$	33,120
	Subtotal	\$ 2,525,000	20	0.04	0.0736	\$	185,840
	Engineering (25%)	\$ 631,250	20	0.04	0.0736	\$	46,460
	Contingency (25%)	\$ 631,250	20	0.04	0.0736	\$	46,460
		\$ 3,787,500	20	0.04	0.0736	\$	278,760
O&M	O&M (4% of capital)	\$ 101,000				\$	101,000
	Personnel	\$ 100,000	3			\$	300,000
	Annual Energy Return (23.5 MW)	\$ (3,600)				\$	(3,600)
						Annualized cost	\$ 676,160

OPTION 4A-HAUL LIQUID						A/P, 20,4%	
						Cost	Annual
		Item	term	interest	Factor	Cost	Cost
Capital	Retrofit at Plant	\$ 500,000	20	0.04	0.0736	\$	36,800
	Subtotal	\$ 500,000	20	0.04	0.0736	\$	36,800
	Engineering (25%)	\$ 125,000	20	0.04	0.0736	\$	9,200
	Contingency (25%)	\$ 125,000	20	0.04	0.0736	\$	9,200
		\$ 750,000	20	0.04	0.0736	\$	55,200
O&M	Hauling	\$ 575	1500			\$	862,500
	O&M (4% of capital)	\$ 20,000				\$	20,000
						Annualized cost	\$ 937,700

OPTION 4B-HAUL CAKE						A/P, 20,4%	
						Cost	Annual
		Item	term	interest	Factor	Cost	Cost
Capital	BFP	\$ 1,500,000	20	0.04	0.0736	\$	110,400
	Subtotal	\$ 1,500,000	20	0.04	0.0736	\$	110,400
	Engineering (25%)	\$ 375,000	20	0.04	0.0736	\$	27,600
	Contingency (25%)	\$ 375,000	20	0.04	0.0736	\$	27,600
		\$ 2,250,000	20	0.04	0.0736	\$	165,600
O&M	Hauling	\$ 140	1500			\$	210,000
	O&M (4% of capital)	\$ 60,000				\$	60,000
						Annualized cost	\$ 435,600

CITY OF GARDNER SLUDGE ALTERNATIVES

OPTION 5-INCINERATE		A/P, 20,4%				
		Item	term	interest	Cost Factor	Annual Cost
Capital	Retrofit at Plant	\$ 500,000	20	0.04	0.0736	\$ 36,800
	Tank Hauler	\$ -	20	0.04	0.0736	\$ -
	Land Development	\$ -	20	0.04	0.0736	\$ -
	Subtotal	\$ 500,000	20	0.04	0.0736	\$ 36,800
	Engineering (25%)	\$ 125,000	20	0.04	0.0736	\$ 9,200
	Contingency (25%)	\$ 125,000	20	0.04	0.0736	\$ 9,200
		\$ 750,000	20	0.04	0.0736	\$ 55,200
O&M	O&M (4% Capital)	\$ 20,000	1			\$ 20,000
	Haul & Burn	\$ 775	1500			\$ 1,162,500
Annualized cost						\$ 1,237,700



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# Memorandum

**Date:** February 2, 2016

**To:** Dane Arnold, Director (Gardner Water/Sewer Department)

**From:**  Robert Sims (CDR Maguire), Robin Dyer (CDR Maguire)

**Subject:** Landfill Expansion Capacity  
CDR/Maguire, Inc. Project No. 19474.01

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## SLUDGE DISPOSAL BACKGROUND

Since the mid 1980's the City of Gardner has been utilizing the sludge only landfill on West Street for disposal of sludge generated from the wastewater treatment plant (WWTP). The site was permitted to encompass the entire 37 acre parcel taken from multiple parties in 1919. The current landfill footprint only incorporates 11 acres. In addition to the landfill itself, this area includes the existing variable width (14' to 20' wide) perimeter access road and an existing building that houses equipment. Outside of the existing perimeter fence are drainage control including two retention ponds.

The site abuts the former municipal landfill. The former municipal landfill has a gas extraction and energy recovery component. It also has two small buildings, one for equipment and one that houses the sludge landfill leachate pumping station. The former municipal landfill does not have a leachate collection system while the sludge landfill does.

Approximately 400 cy of sludge are generated each month at the WWTP. The sludge is trucked to the site from the WWTP, mixed with amendment, spread and covered daily. The existing sludge landfill is approaching the capacity allowed by its current permit. A new application (WP 44) for vertical expansion of the landfill has been submitted to the Massachusetts Department of Environmental Protection (DEP) and is under review. For more information on the vertical expansion see "Vertical Expansion" below.

The current sludge is historically dewatered to an average solids content of 22%. This information was used to determine an approximate unit weight of the amended sludge to allow for the conversion to tonnage from volume. The sludge is dewatered at the WWTP with the use of two belt filter presses. The current amendment ratio is three (3) parts amendment to one (1) part sludge and yields the design unit weight is 75 pounds per cubic foot.

In addition to the expansion to the landfill, the City of Gardner has enlisted the services of an engineering firm to perform upgrades at the existing WWTP. The first design component is a new headworks facility. In addition to the upgrade of the headworks, the City is also evaluating an upgrade of the sludge processing equipment. The upgrades to the sludge processing equipment will allow for the reduction in the amendment ratio due to attaining a higher solids content in the sludge. The amendment is added to increase the workability; the drier the sludge, the less amendment that is

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required. Currently an amendment (sand) is mixed with the sludge at a 3:1 ratio. Through pilot testing, the new processing equipment is expected to produce a drier sludge (30% solids) and lower the ratio to 2:1. This change will result in significant savings and extend the life of the landfill.

#### **PREVIOUS WORK**

As part of the ongoing management of the landfill, we have reviewed the last few years of the Operations Reports generated by the contract operator (Suez North America) as well as performed a Sludge Recommendation study (2012) to analyze a horizontal expansion. An existing conditions survey was completed by DiPrete Engineering Associates, Inc. in 2012 to assist in the evaluation of the possible vertical expansion of the sludge landfill. CDR/Maguire, Inc. prepared a slope stability analysis in 2012 for the City of Gardner to confirm that the vertical expansion of the landfill was possible. Areas of concern included the area where washouts previously occurred. It was determined that a 3 ft horizontal to 1 ft vertical side slope was acceptable.

#### **VERTICAL EXPANSION**

In November of 2014, United Water submitted a plan for the vertical expansion of the landfill. This was to be a temporary solution until a horizontal expansion could be planned and executed. The vertical expansion would raise the top of the sludge landfill from its current cap elevation of 1020.0 to elevation 1046.0. This additional capacity would add 107,563 cubic yards (CY) which is equivalent to adding approximately six (6) years to the life of the existing landfill with the current 3:1 amendment ratio. The initial survey was completed in August 2012 for the site. The revised buildout elevation would be reached in the year 2018.

#### **WORK PERFORMED TO DATE**

Additional survey of the horizontal expansion area was completed by DiPrete Engineering Associates, Inc. in October and November, 2013. The boring program was completed in November, 2013. Seven 2-inch diameter groundwater monitoring wells were installed at the location of the seven borings. The monitoring wells include a 4-inch diameter steel sleeve and locking cap. The boring locations were staked in the field by DiPrete Engineering Associates, Inc. As drilled location were determined by tape and hand compass from the staked locations. In February, 2014 CDR/Maguire issued a report entitled, "Geotechnical Report Proposed Sludge Landfill Expansion Area Subsurface Characterization." This report covered the findings from the field and laboratory testing for the soils. Also, included were water table adjustments using the method described in "Probable High Ground-Water Levels in Massachusetts", issued by the U.S. Geological Survey in cooperation with the Commonwealth of Massachusetts Department of Environmental Quality Engineering, known as the "Frimpter Method".

#### **HORIZONTAL EXPANSION**

The current 3:1 amendment to sludge cake ratio and a potential 2:1 amendment to sludge ratio have been evaluated in the determination of the life expectancy for the expanded landfill. The decreased ratio is based on the new sludge dewatering process being more efficient than the current one. The current product averages 22% solids. The expectation of the new method is a final product of 30% solids (less water). The higher solids content allows for less amendment to make the product "workable" at the landfill.

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The volume of a proposed horizontal landfill expansion was estimated using the program AutoCAD Civil-3D. This was done utilizing the existing survey information collected by DiPrete Engineering Associates, Inc. and water table information gathered by our geotechnical engineer. This information was input into AutoCAD Civil 3D and representative surfaces were developed. A surface was created which represented the existing groundwater table with the input of water table data from the seven borings, supplemented with engineering assumptions about extrapolating beyond existing data points. Along the edge of the wetlands, a water table with a two foot depth was assumed. The existing site was then graded down to the elevation four feet above the ground water table, utilizing 3:1 side slopes. In areas which were already steeper than 3:1, the existing grading remained and the proposed grades were tied into those areas. No grading was to be done within one hundred feet of the wetlands or fifty (50) from the northeasterly property line. This resulted in the removal of 155,412 CY of existing material. A new surface was then developed with a merger of the existing grades, proposed vertical expansion and the new lowered grading. This was designated as the new existing condition to determine the volume of sludge which the site could accept. The site was then graded up to elevation 1060 and a new surface was developed to represent this condition. The proposed grading was also used to develop surfaces with cap elevations of 1020, 1030, 1040 and 1050. These surfaces were then compared to the new existing surface to determine storage capacities at the various elevations. The table below shows the additional volume as they relate to the elevations.

Landfill Cap Elevation	Landfill Volume (CY)
1030	367,831
1030	470,732
1040	554,633
1046	594,249
1050	620,659
1060	666,142

Horizontal expansion would increase the portion of the site utilized for the sludge land fill from 11 acres to approximately 19.5 acres of the 37 acres previously permitted. The proposed layout will maximize the available property. The remaining land is a buffer, wetland or functionally unusable.

#### LANDFILL LIFE

Using the geospatial data, an estimate of the volume of space available within the landfill property was calculated. This volume was divided by the annual volume of material generated annually. Based on this information, we determined the number of years the life of the landfill would be extended for each proposed elevation. This calculation was performed both the 2:1 and 3:1 amendment ratios. We have also included a conservative settlement factor of 30% for the sludge. The following table shows the results of these calculations, assuming the deposit of 400 CY of sludge within the landfill each month.

For the sake of the evaluation, we ran the calculations for a variety of cap elevations. Additional years of capacity can be attained by increasing the cap elevations. However, because of the pyramid shape, the extra elevation does not translate to significantly more volume. For example, the volume increases 15% when raising from 1030 to 1040, but only 7% when raising it from 1050 to 1060.

For the recommended analysis, we assumed that the cap of the horizontal expansion would match the current planned cap of the vertical expansion (1046.0 feet). Therefore, the new landfill will have a cap elevation of 1046.0 and the life would be 45.8 years at a 2:1 sludge to amendment ratio and 33.4 years for a 3:1 ratio.

Final Landfill Cap Elevation	Available Volume (cy)	Years at 3:1 (current conditions)	Years at 2:1 (dewater upgrades)
1020	367,831	20.7 yrs	28.4 yrs
1030	470,732	26.5 yrs	36.3 yrs
1040	554,633	31.2 yrs	42.8 yrs
1046	594,249	33.4 yrs	45.8 yrs
1050	620,659	34.9 yrs	47.8 yrs
1060	666,142	37.5 yrs	51.3 yrs

### COSTS

Based on the cost estimate of developing the landfill site at \$150,000 per acre, we estimate that preparing the site to receive sludge will cost \$1,275,000 (\$150,000 for 8.5 acres).

Because the landfill will last longer than the 20-year planning period, we developed an annual cost for the life of the landfill and then amortized the cost of a 20-year period. For example – the \$1.275 million dollars to develop the landfill for the cap elevation of 1046 feet for the proposed conditions would spread over 45.8 years. The amortized cost of the landfill would calculate to be \$55,200 per year.

Calculating the present worth for the 20-year design period would result in a capital cost of the 20-year landfill of \$770,000. For the current amendment conditions (3:1), the same procedure is utilized except the original \$1,275,000 is spread out over 33 years. The resulting 20-year present worth cost would be \$903,000.

### CONCLUSION

The conclusion is based on the horizontal expansion being capped at the same elevation as the current landfill after vertical expansion approval. At a sludge to amendment mix of 2:1, the expanded landfill will have an estimated life of 45.8 years and project an annual cost of \$55,200. If the sludge to amendment ratio remains at 3:1, the life shortens to 33.4 years and the annualized cost increases to \$65,000. The 20-year present worth of the two options is \$770,000 and \$903,000 respectively.



**INFORMAL MEETING OF SEPTEMBER 19, 2016**

Informal Meeting of the City Council was held in the City Council Chamber, Room 219, City Hall, on Monday evening, September 19, 2016.

**CALL TO ORDER**

Council President James Walsh called the informal meeting to order at 6:00 o'clock p.m.

**ATTENDANCE**

Eleven (11) Councillors were present, including President James Walsh and Councillors James Boone, Nathan Boudreau, Craig Cormier, Ronald Cormier, Scott Graves, Karen Hardern, James Johnson, Marc Morgan, Paul Tassone, and Matthew Vance.

Others in attendance were Robert P. Sims, P.E., CDR|Maguire and OPM for the City's Project; Kevin Olson, Project Designer, Wright-Pierce; Matt LaPointe, Suez Project Manager; Dane Arnold, DPW Director; and, Christopher Coughlin, Assistant City Engineer.

Robert Sims presented the following Power Point slides:

**History and Future of Sludge Disposal in the City of Gardner**

Robert P. Sims, P.E.  
*Project Manager*  
*CDR Maguire Inc.*  
September 19, 2016

**Background**

- First Collection System install about 1908
- Treatment consisted of screening and sand filter beds, sludge removed by hand raking and disposal with municipal waste at landfill
- Plant upgraded in 1948 with new screening
- Plant upgraded in 1968 with new screening, enhanced treatment and capacity expansion
- Plant updated in 1984 to include additional treatment processes and updated screening
- Sludge-only landfill constructed and utilized in 1984

INFORMAL MEETING OF SEPTEMBER 19, 2016

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Recent Activities

- Performed Detailed Facility Plan of Treatment Plant (3 Phase Plan)
- Facility Plan identified areas for improvement and evaluation of technologies
- Concurrently performed evaluation of sludge landfill
- Suez applied and received permission from DEP for vertical expansion. Permission included odor control analysis/modifications
- Implementation of Phase I of Facility Plan – New Screening Facility

Mr. Sims noted that the area of the parcel inside the fence is under the control of Suez, while the City controls the area outside the existing fence. He said that Suez has been addressing the odor emanating from the vertical landfill and has received only one complaint in the past 15 months. DEP has tentatively approved the expansion plan, he added.

Concerning the new Screening Facility, Mr. Sims noted that the phase is about 25% completed.

Phase II

- Upgraded the dewatering technology
- Determine sludge disposal plan

Dewatering

- Less water translates to less volume
- Less volume translates to less material to transport/dispose
- Less material to transport/dispose translates to savings

Mr. Sims stated that the current operation utilizes a belt filter press, after which the sludge is hauled to the sludge landfill.

Dewatering Technology Evaluation

- Belt Filter Press
- Rotary Drum
- Fournier Press
- Centrifuge

INFORMAL MEETING OF SEPTEMBER 19, 2016

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**Belt Filter Press**

- Current technology
- Produces sludge cake at 22% solids
- Building Improvements
- New chemical feed

Mr. Sims stated that the existing building would have to undergo structural improvements, and a new chemical feed comprising polymers.

**Inclined Screw**

- New technology for employees
- Produce cake at 22% to 26% solids
- Building improvements
- New chemical feed
- Delicate optimization

Mr. Sims stated that inclined screw technology is akin to a bucket with holes whereby the water drains from the container and is returned to the plant and the sludge is hauled away. He said that he and others conducted a site visit to a similar operation and noted that the operator "is required to spend a lot of time to make it work," including many adjustments.

**Fournier Press**

- New Technology for employees
- Produce sludge at 21% to 23% solids
- Building Improvements
- New chemical feed

Mr. Sims stated that the Fournier Press is similar to the inclined screw technology, except that "it goes around in a circle and comes out at the sides, after being squeezed out."

**Centrifuge**

- New technology for employees
- Produces cake at 28% to 32% solids
- Building improvements
- New chemical feed
- Computerized optimization



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**INFORMAL MEETING OF SEPTEMBER 19, 2016**

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Mr. Sims stated that the Centrifuge system creates much drier cakes, "spinning similar to a washing machine on spin cycle." He said that the system is computerized and can dictate the moisture content in the end product. At a site visit to a Centrifuge operation, he noticed that the vibration of the Centrifuge is minimal "and the operators loved it."

**Cost of Options for Dewatering**

- **Belt Filter Press - \$14,500,000**
- **Inclined Screw - \$14,300,000**
- **Fournier Press - \$16,000,000**
- **Centrifuge - \$12,800,000**

Mr. Sims stated that the cost of the various options includes additional electricity and building upgrades. He said that the team felt that the Centrifuge is the best option for dewatering the sludge.

President Walsh questioned whether there is a relationship between odor and the amount of water in the sludge.

Mr. Sims responded, saying "Yes, the bugs are going to use oxygen to generate the odor (oxygen sulfides), which the water provides. He added that odors at the landfill are caused mostly from aeration and is controlled by cover management.

Councillor Marc Morgan questioned whether the Centrifuge option included incineration.

Mr. Sims replied that no incineration is involved.

Councillor Morgan asked if the cost for an incinerator has been ascertained.

Mr. Sims stated that the cost for permitting an incinerator "would be outrageous."

Noting that the Centrifuge method is less costly than the other presented options, Councillor Boone questioned whether the Centrifuge process would cost more in the future.

Mr. Sims responded, saying that the additional electricity costs and the addition of polymers have been taken into account in the cost projections. He noted that electricity for the plant is purchased from Templeton Municipal Light and Water Plant.

Councillor Matthew Vance questioned the time frames that the estimates are based.

Mr. Sims responded, saying that they are 20-year estimates, adding that in strictly financial terms, the longer the loan, the more spread out the costs. The figures "are the present worth" spread over twenty years, he said.

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On questioning by Councillor Tassone, Mr. Sims stated that capital costs, operational costs, and maintenance costs are all included in the projections for all four options, the cost data having been provided by the manufacturers.

President Walsh confirmed with Mr. Sims that the cost projections provided by the consultant are for a twenty-year period.

Councillor Boone questioned the Centrifuge option and whether it is being utilized elsewhere in Massachusetts.

Kevin Olsen stated that Manchester, New Hampshire operates a Centrifuge system and that the City of Haverhill is operating two new Centrifuge systems, which "is tried and true" and what [the industry] considers "a higher speed technology."

Mr. Sims announced the four different options of disposing of the sludge, as follows:

Composting

- New building and infrastructure required
- Siting at sludge landfill
- Odors more likely and costly to control
- New equipment
- Training required
- Disposal concerns
- Additional testing

Mr. Sims stated that if the City decided not to expand the sludge landfill, then the land could be used for composting. He cited the Town of Pepperell's composting operation, as an example.

Anaerobic Digestion

- Significant Infrastructure
- Siting at the sludge landfill
- Training needed
- Collection and storage of food waste
- Energy discharged to Electric Grid
- Concerns with Viability
- Disposal of material not eliminated, byproduct created

**INFORMAL MEETING OF SEPTEMBER 19, 2016**

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Mr. Sims stated that anaerobic digestion has been a popular option in the last few years, where food waste is mixed with sludge from treatment plants which produces a fair amount of methane, which can be run through a methane generator and sold back to the grid. The downside is that the economies of scale are very difficult to maintain.

**Private Hauling**

- Minor infrastructure
- Expensive
- Volatile Pricing
- - Fuel Costs
- - Regulation Changes
- - Disposal Site Availability
- - Term of Contract

**Sludge Landfill**

- Minor infrastructure (already exists)
- Entire site already permitted (in 1986) – DEP would only have to permit the design of the sludge landfill.
- New procedures have greatly reduced odors
- No new equipment
- Lifespan beyond 20-years (35-40 years with new technology)

**Cost of Sludge Disposal Options (20-years)**

- Private Hauler - \$12,800,000
- Landfill - \$7,500,000

**Customer Base**

- City Maintains 5,600 accounts
- Bills quarterly
- Sewer charge directly related to water use
- Average sewer bill is \$107 per quarter

**Cost Impact to Customer**

- Private hauler - \$29 per quarter (27%)
- Landfill - \$17 per quarter (16%)

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Summary

- Landfilling Saves \$5,300,000 versus hauling
- Equates to 10%-15% in savings for each customer versus hauling
- Stabilizes cost for the long run
- Odor concerns reduced
- Use of existing technology (no training)
- Recommend continue the disposal of sludge at the landfill based on cost, volatility and new odor control procedures.

President Walsh questioned whether there is an option to haul the sludge to an incinerator, one that would provide less expense and less volatility.

Mr. Sims stated that there are 6 to 8 incinerators in the state, but that none have been permitted in over 20 years. He noted that the cost for incineration is very expensive; however, he would provide the Council with incineration estimates based on 30% sludge cakes. He added that incineration leaves approximately 10% ash.

Councillor Marc Morgan asked that if sludge landfill is expanded, then would sludge from outside the City be transported to the landfill.

Dane Arnold responded, stating that only sludge from the Gardner WWTF would be hauled to the landfill.

Mr. Sims said that it was his belief that the DEP Permit allows only Gardner WWTF sludge.

Councillor Scott Graves questioned whether odor-control measures included only covering.

Mr. Sims responded, saying that tests were conducted "with sludge and the sun." When sludge is deposited, covered with daily cover, sits for a weekend, then "turned" on Monday, odors are then generated, he said. He noted that the landfill is being treated with excess cover when weather conditions warrant additional cover and that DEP is pleased with the efforts.

Councillor Paul Tassone questioned the options that the City might have available for dealing with the sludge after 35 years.

Dane Arnold expressed hope that new technology would become available to deal with the sludge in the future.

Mr. Tassone followed up, asking what effect, if any, an expansion would have on the abutting properties and what barriers are in place.

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Citing the "Gardner Sludge Landfill Expansion Area, Drawing No. 2," Mr. Sims said that the areas highlighted in green are identified as wetlands and that the portion of the land in between is not an option, since expansion in this area wouldn't make sense. He said that the plan proposes to expand the landfill easterly of the existing sludge landfill and noted that there is a 50' buffer between the landfill and the solar array, which is northerly of the proposed expansion area. He added that there would remain a significant buffer zone in the southern portion of the parcel (the area between the defined wetland areas). Mr. Sims stated that the 37-acre section has already been permitted for a sludge landfill and that the proposed expansion is within the permitted area.

Councillor Nathan Boudreau suggested that should new technology not achieve the desired effect in 35 to 45 years, "will Gardner anticipate rolling hills of sludge landfills for the next generation?"

Mr. Sims responded, saying that the proposed landfill will be at the same elevation as the existing [sludge] landfill, which is about 60 feet lower than the City's closed landfill. He added that he cannot predict the City's sludge situation in 35 to 45 years.

Citing the anaerobic digestion option, Councillor Vance questioned whether Gardner has sufficient food waste to make the option financially viable.

Mr. Sims suggested that the amount of food waste that could be generated and hauled to a facility likely would not be sufficient to make it financially feasible.

Mr. Arnold noted that when the sludge landfill is full in 35 to 45 years, perhaps an anaerobic digestion facility could be an option. He added that siting an incinerator in Gardner on State-owned land (i.e. NCCI), if allowed by the DEP in the future, both sludge and the City's solid waste could be handled there.

Councillor Karen Hardern questioned the makeup of the materials that are used for the daily cover in order to reduce odor, asking whether certain agents or chemicals are added.

Mr. Sims responded, saying that the cover is made up of mostly sand and gravel.

Councillor Scott Graves asked if the DEP Permit for the unused portion of the property for use as a sludge landfill is still in effect, even though 30 years has passed since its issuance.

Mr. Sims responded, saying that DEP, formerly known as DEQE, issued the Permit in 1986 and it is still valid.

Councillor Paul Tassone requested clarification of the number of Massachusetts communities that operate sludge landfills.



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Mr. Sims responded, stating that 20% of the communities operate sludge landfills.

Councillor James Boone questioned whether [sludge] incinerator technology “is completely dead” or has improved to a point whereby Gardner could stop storing sludge at a landfill and begin incinerating it in the future.

Mr. Sims responded, saying that “we’re looking at 40 years out, so anything is possible.”

Dane Arnold noted that there is a moratorium on incinerator siting in Massachusetts.

The meeting was adjourned at 7:03 p.m.

Accepted by the City Council: *October 3, 2016*